REMEDIAL SITE ASSESSMENT DECISION - EPA REGION I

Site Name: Harco Property EPA ID#: CTD 983973258

Alias Site Names:

City: Wilton County or Parish: State: CT

Refer to Report Dated: January 6, 1995 Report type: SI

Report developed by: CDM FED ARCS

Superfund Records Center
SITE: Harco
BREAK: 1.3
OTHER: 574621

DECISION:

| | 1. Further Remedial Site Assessment under CERCLA (Superfund) is not required because:

| | 1a. Site does not qualify for further remedial site assessment under CERCLA (Site Evaluation Accomplished - SEA)

| | 1b. Site may qualify for further action, but is deferred to: | | RCRA | | NRC

| | 2. Further Assessment Needed Under CERCLA: 2a. (optional) Priority: | | Higher | ✓ | Lower

2b. Activity Type: | | PA | ✓ | ESI | | SI | ✓ | HRS evaluation | | Other:

DISCUSSION/RATIONALE:

Report Reviewed and Approved by: Signature: Date:

Site Decision Made by: Signature: Jane Dolan Date: 1-9-95

EPA Form # 9100-3

SDMS DocID 574621

ARCS I

Final Site Inspection Report

Harco Property

Wilton, Connecticut

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY, Region I
Waste Management Division
Boston, MA

Work Assignment No.:	23-1JZZ
EPA Region:	I
CERCLIS No.:	CTD983873258
TDD No.:	9209-75-ACS
Contract No.:	68-W9-0045
Document No.:	7710-023-FR-BNLV
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Date Prepared:	January 6, 1995

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Wilton, Connecticut

CERCLIS No. CTD983873258
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INTRODUCTION

The CDM Federal Programs Corporation (CDM) Alternative Remedial Contracting Strategy (ARCS) team was requested by the U.S. Environmental Protection Agency (EPA) Region I Waste Management Division to perform a Site Inspection (SI) of the Harco Property in Wilton, Connecticut. Tasks were conducted in accordance with the ARCS Contract No. 68-W9-0045, the SI scope of work dated September 3, 1992, and technical specifications provided by EPA under Work Assignment No. 23-IJZZ, which was issued to CDM on September 22, 1992. A Preliminary Assessment (PA) was prepared by the Connecticut Department of Environmental Protection (CTDEP) on May 12, 1992.

Background information used in the generation of this report was obtained through file searches, telephone interviews with town officials, conversations with persons knowledgeable of the Harco Property and conversations with other federal, state, and local agencies. Additional information was collected during the CDM onsite reconnaissance on April 26, 1994, and environmental sampling event on June 22, 1994.

This package follows the guidelines developed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA regulations such as those under the Resource Conservation and Recovery Act (RCRA) or other federal, state, or local regulations. SIs are intended to provide a preliminary screening of sites to facilitate EPA's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

SITE DESCRIPTION

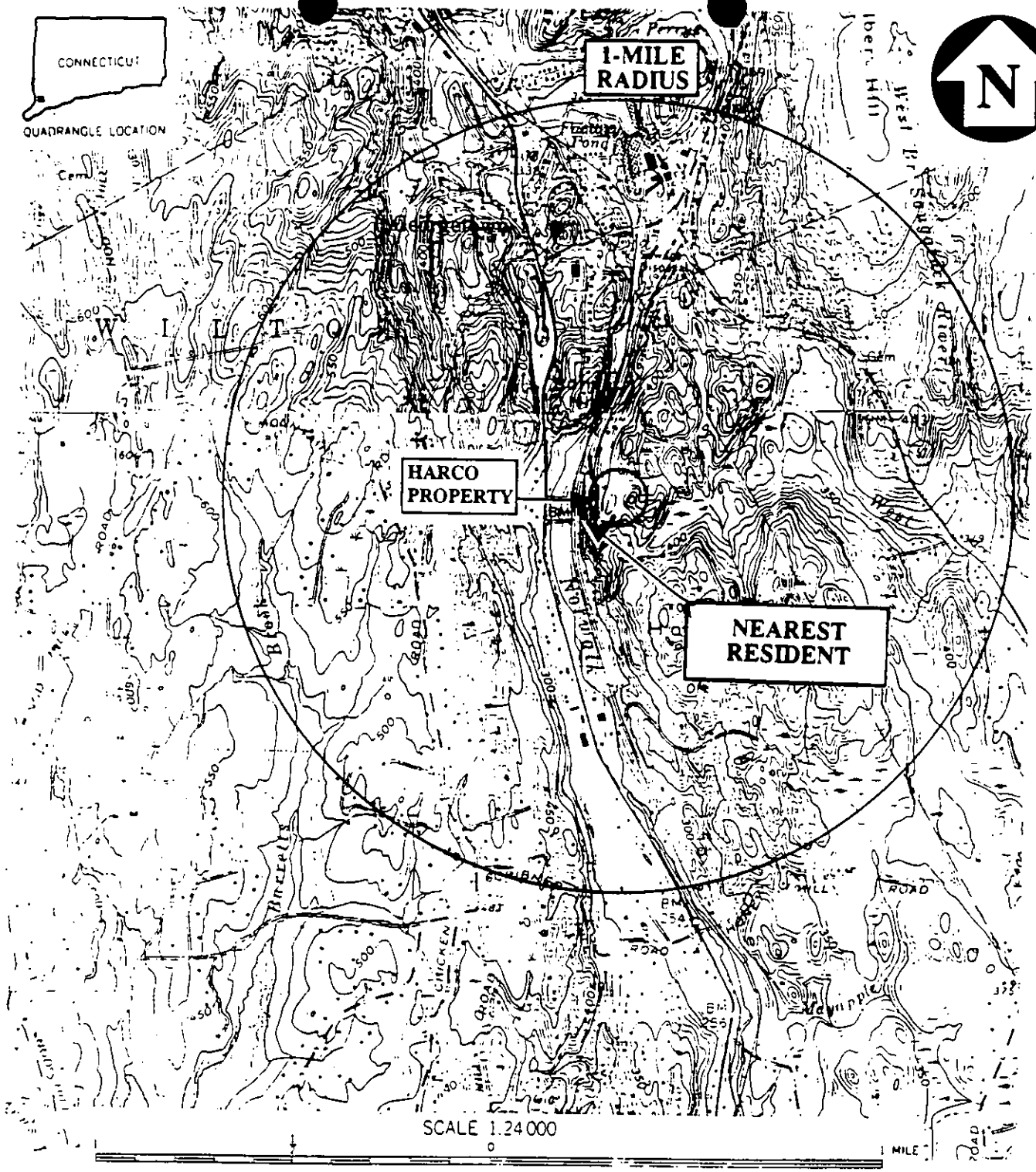
The Harco Property is located at 44 Old Mill Road in Wilton, Fairfield County, Connecticut. The geographic coordinates for the property are Latitude 41° 14′ 46″ N, Longitude 73° 25′ 54″W (see Figure 1: Location Map) [35]. The property is a 41.1-acre parcel of heavy vegetation in which 2.0 acres of the land are cleared. The 2.0-acre clearing consists of shrubs, bushes, and wetlands. The property is bordered by the Machala residence and woodlands to the north, an area of wetlands and the West Branch of the Saugatuck River to the east, the Caggino residence and Honey Hill Road to the south, and the Harco, McGarry, and Kelly residences to the west [29]. No structures or buildings have been established on the property [2]. A chain-link fence encloses the 2.0-acre area. Within the fence is a depression approximately 10 feet in depth. Water collected in the depression drains toward the east. Surface water runoff occurs after a considerable amount of precipitation has collected in the depression. Wetlands located to the north of the depression create an unnamed stream that flows southeast toward the West Branch of the Saugatuck River (see Figure 2: Site Sketch) [2,17].

OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

Most (39.1 acres) of the 41.1-acre parcel is currently owned by Costa Stergue; the remaining 2.0 acres are owned by Thomas King [2,5,8]. In 1987, Mr. Stergue purchased his property from Ms. Florence Harco, estate beneficiary to the late Peter Harco, Sr. [5,8,16]. Mr. Harco owned the property from 1966 to 1987. Prior to 1987, the property at 44 Old Mill Road had been in the Harco family since 1923 [21].

From 1923 to 1987, the Harco Property was used briefly as a quarry for the mining of silver (approximately 1 year) and as a dumping area for the remaining 63 years. The quarry operations created a 2.0-acre depression in the 41.1-acre parcel [2,8,17]. In his search to backfill the mined area, Peter Harco, Sr. made an agreement with Gilbert and Bennett Manufacturing Company (CTD000847764) to allow for the disposal of 800 cubic yards of dried iron oxide, lime, and calcium sulfate (sludge) [6,33]. In November 1970, the State of Connecticut Water Resources Commission and the Town of Wilton Planning and Zoning Commission granted a permit for the disposal of the sludge, without treatment, to the depression [6]. The Gilbert & Bennett Manufacturing Company produces steel wire rods that require acid cleaning. Iron oxide, lime, and calcium sulfate are by-products of the treatment process [14].

On July 17, 1979, the Connecticut Department of Health and Town of Wilton Board of Health inspectors performed a site inspection to determine the potential for development of the property. The conclusion drawn from the inspection was a recommendation for a detailed study of pollution and contaminants onsite before any site development [5]. In December 1985, G&D Construction and Mr. Harco submitted a *Soil Suitability Data For An 11 Lot Subdivision* report to the CTDEP requesting permission for site development. The report was prepared by Grumman Engineering Associates. The report included data for the percolation of soil at the Harco Property, boring logs, and soil sample analysis using the extraction procedure (EP) toxicity. The sample analysis detected concentrations of chromium (0.03 milligrams per liter



Source: Adapted from the 1992 CTDEP Preliminary Assessment, Harco Property

LOCATION MAP
HARCO PROPERTY
WILTON, CONNECTICUT

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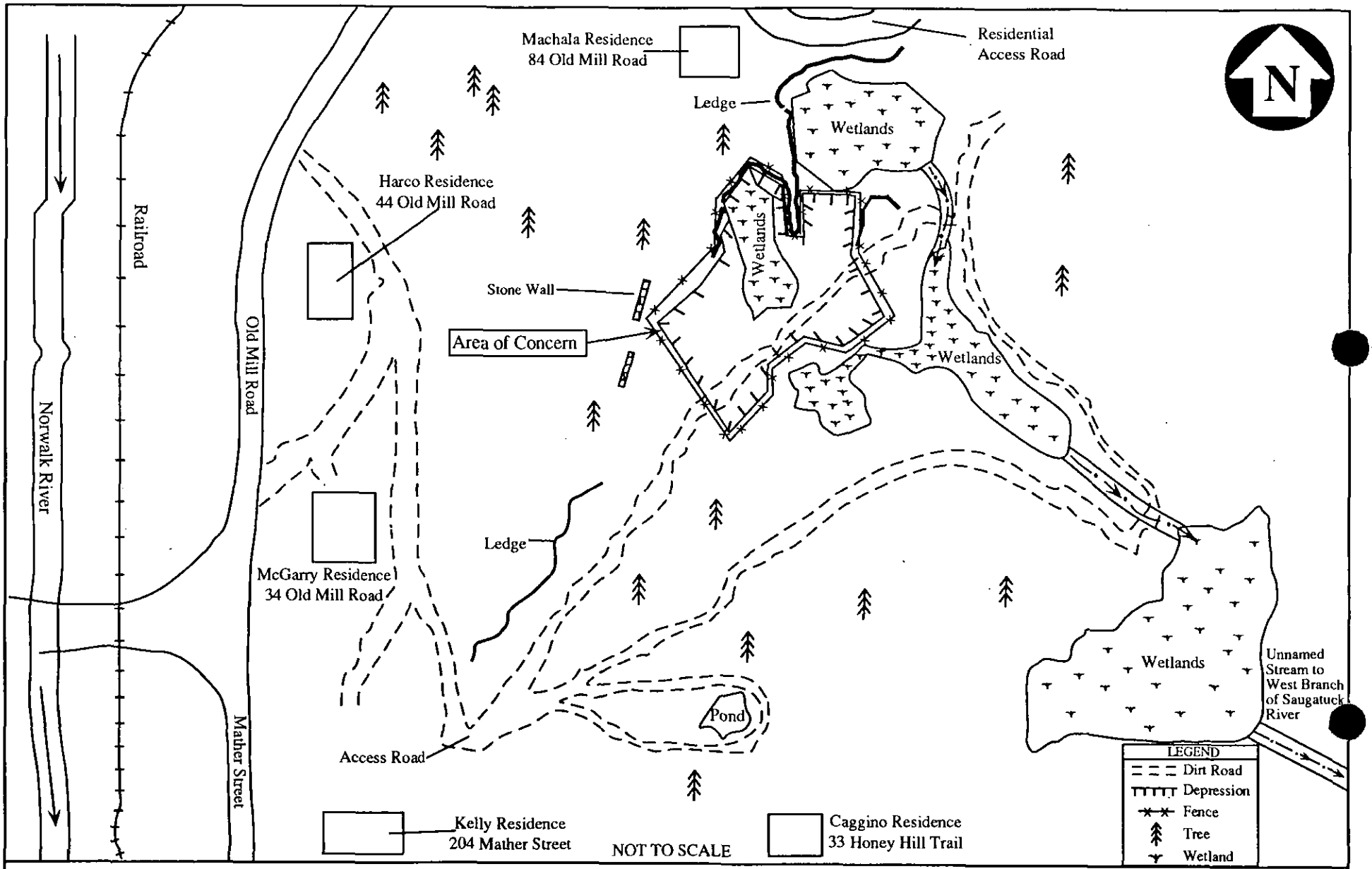
Figure 1



SITE SKETCH
HARCO PROPERTY
WILTON, CONNECTICUT

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Figure 2

(mg/l)), chloride (160 mg/l), copper (0.04 mg/l), tetrachloroethylene (3 parts per billion (ppb)), and trichloroethylene (34 ppb) [9].

From 1982 to 1985, the Town of Wilton zoning office issued Peter Harco, Sr., three "Cease and Desist orders" to stop future dumping activities at the property [8]. In 1985, CTDEP sampled drinking water from 32 residences near the Wilton Landfill and the Harco Property. The samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and inorganic analytes. The results showed that only one residence contained contaminants in its drinking water at concentrations greater than background concentrations. The residence, at 94 Mather Street, is located southwest of the Wilton landfill and the Harco Property. The contaminants detected included chloride (71 parts per million (ppm)) and sodium (27 ppm). CTDEP concluded that the contamination of the residence well was due to leachate from the landfill [3,5].

On January 17, 1986, the Town of Wilton Planning and Zoning Commission denied the request for site development and recommended the removal of waste material at the Harco Property [5]. In 1980, a local citizen's group, called PEACE, Inc., concerned over the disposal practices at the Harco Property and the Wilton Landfill (located 0.5 mile south of Harco Property on Mather Street), had private wells in the area sampled and analyzed for drinking water parameters. The laboratory used by PEACE, Inc., was not a state or federal certified laboratory. The sampling results identified the presence of phthalates. The presence of this contaminant was never confirmed by later CTDEP sampling [5,8].

On April 30, 1987, Costa Stergue purchased 39.1 acres of the Harco Property, which included the 2.0-acre area used for the disposal of the iron oxide, lime, and calcium sulfate. The remaining 2.0 acres of the 41.1-acre parcel were later purchased by Thomas King [2,8].

EPA entered the Harco Property into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on August 2, 1990 in response to concerns by Senator Joseph I. Lieberman [10,13,33]. On September 25, 1990, the EPA Emergency Planning and Response Branch initiated a Preliminary Assessment/Site Investigation (PA/SI) in response to Senator Lieberman's concern [5,8,28,29]. The PA/SI was performed by Roy F. Weston (Weston). Sampling during the investigation identified high concentrations of lead and zinc in the soil and surface water at the property [28]. A removal was not performed during this investigation [28].

On March 30, 1992, an Extent of Contamination Survey was performed at the Harco Property by Weston for EPA. During this investigation, samples were collected from surface soil, surface water, and breakout water from the Harco Property, and from nearby residents' private wells used for drinking water. The results from this survey indicated the presence of lead and zinc at elevated concentrations in surface soil samples at an estimated depth of 1.5 feet. Weston determined that approximately 3,125 cubic yards of contaminated soil with a minimum lead concentration of 500 ppm exists at the Harco Property. The surface water sample analysis detected elevated levels of lead (90 ppb) and zinc (2,780 ppb) from the surface water runoff path

which flows from the easternmost wetlands south towards the unnamed stream. The analysis of the drinking water samples detected above background concentrations of nickel (4 ppb) in one residential well and zinc (91 ppb, 35 ppb, 42 ppb) in three additional residential wells [29].

On June 23, 1992, CTDEP collected surface water samples from a stream that flows from the property into the West Branch of the Saugatuck River. Analysis of the surface water samples revealed concentrations of lead ranging from 0.007 mg/l to 0.039 mg/l [4]. Additional surface water samples were collected downstream of the Harco Property and the Wilton Landfill, at Samuelson Road. Concentrations of lead were detected in the samples at 10 times greater than the sample concentrations at the Harco Property. On June 30, 1992, CTDEP completed a benthic assessment of the unnamed stream to assess the water quality of the stream. The study concluded that the benthic macroinvertebrate community observed at the Harco Property appeared to be non-impaired by the wastes disposed of at the property and stated that the water quality of the unnamed stream was fair [37].

From June 23 through June 25, 1992, Gilbert & Bennett Manufacturing Company contracted Malcolm Pirnie, Inc. to characterize the extent of contamination at the Harco Property. Subsurface soil samples were collected and analyzed for VOCs and inorganic analytes. The sample results detected elevated concentrations of lead and zinc similar to those detected in the EPA Extent of Contamination Survey but at sample depths of up to 8 feet below ground surface [1,8,11,15]. The data collected during this investigation increased the estimate of the volume of contaminated soil with greater than or equal to 500 ppm concentrations of lead from 3,125 cubic yards to 24,000 cubic yards [11].

From June 1992 to April 1993, EPA, CTDEP, and Gilbert & Bennett Manufacturing Company met several times to discuss the extent of contamination at the Harco Property. Options for remediation of the site were also discussed among the parties. On April 29, 1993, EPA sent a letter to CTDEP stating that its position for site remediation was to install a fence around the contaminated area and then place a cap over the exposed areas of contamination. On September 10, 1993, a chain-link fence was installed at the Harco Property by Malcolm Pirnie, Inc. [8].

On April 26, 1994, CDM conducted an onsite reconnaissance. Activities included a meeting with Paul Groulx (Onscene Coordinator for the EPA Emergency Planning and Response Branch) and a walk over of the property. On June 22, 1994, CDM collected surface water and sediment samples at the Harco Property and drinking water samples from nearby residences. A total of 23 samples were collected: six surface water, nine sediment, five drinking water, one equipment blank, and two trip blanks. In addition, ten performance evaluation (PE) samples were sent along with the samples collected in accordance with the Task Work Plan for Onsite Reconnaissance and Sampling at Harco Property, dated June 1994 (see Figure 3: CDM Sampling Locations) [2]. Deviation from the Task Work Plan occurred at sample locations SW-03, SW-04, SW-08, and GW-05. At the three surface water sample locations, insufficient amounts of surface water were available for collection; however, sediment samples were collected at those locations as planned. Due to time constraints, drinking water sample location GW-05 was eliminated from the sampling agenda. All other Data Quality Objectives outlined in the Task

Work Plan were met. Details regarding CDM's sediment, surface water, and tapwater samples are provided in the Surface Water Pathway section and Groundwater Pathway section of this report.

Table 1 presents identified structures or areas at the Harco Property that are potential sources of contamination, the containment factors associated with each source, and the relative location of each source.

TABLE 1

Source Evaluation for Harco Property

Potential Source Area	Containment Factors	Spatial Location
2.0 acres of contaminated soil	None	North-center of property

[2,5,8,11,17,28,29]

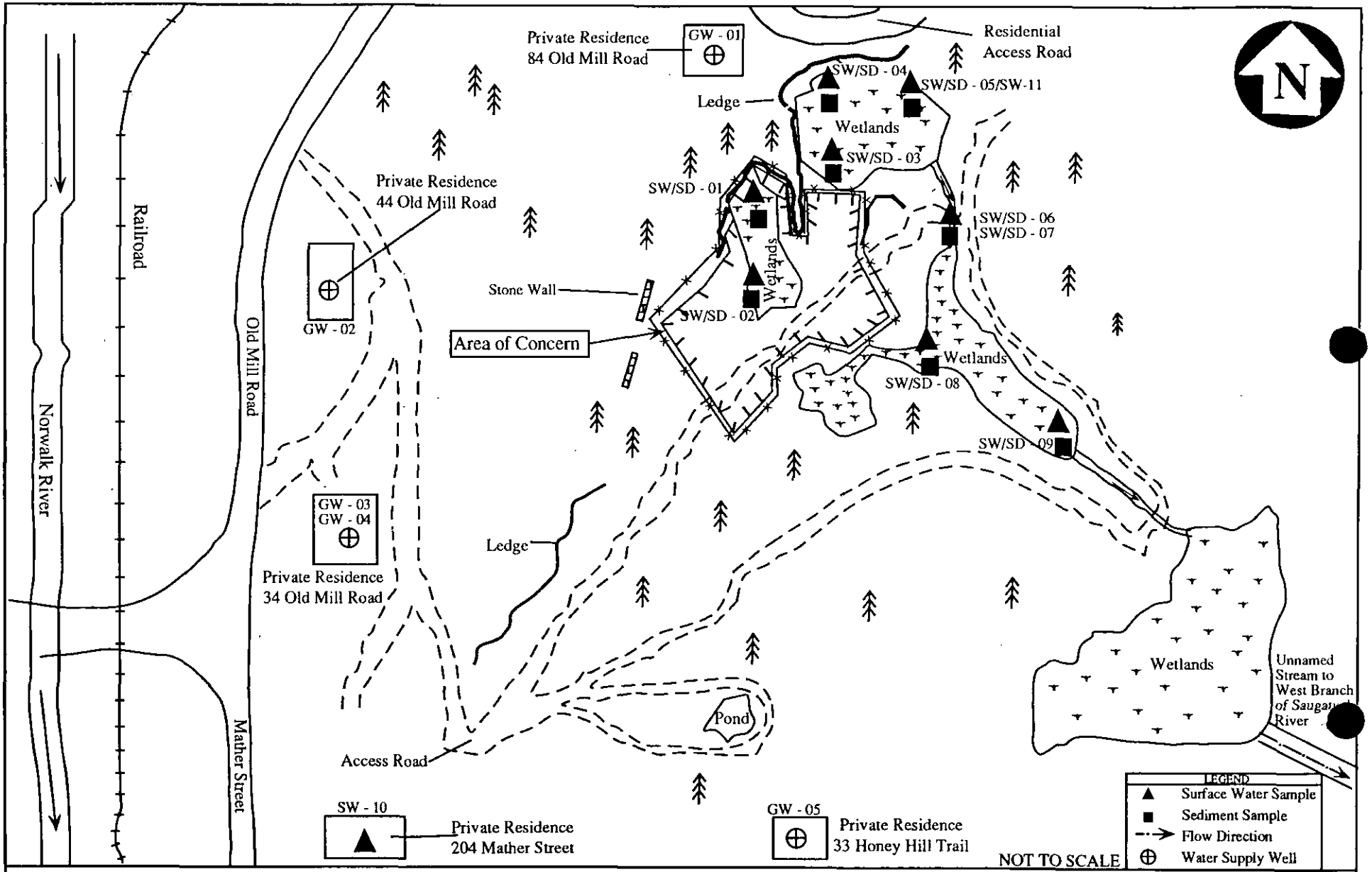
Table 2 summarizes the types of potentially hazardous substances that have been disposed of, used, or stored on the property.

TABLE 2

Hazardous Waste Quantity for Harco Property

Substance	Quantity or Volume/Area	Years of Use/Storage	Years of Disposal	Source Area
Iron oxide, lime, and calcium sulfate	800 cubic yards	1979 to present	1979	2.0-acre clearing
Lead/zinc Contaminated soil	24,000 cubic yards	Not Applicable	Not Applicable	2.0-acre clearing

[1,6,8,28,29]



CDM SAMPLING LOCATIONS
HARCO PROPERTY
WILTON, CONNECTICUT

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Figure 3

No permits were established under the RCRA or the National Pollutant Discharge Elimination System for the waste disposed of at the Harco Property [32]. Potential sources of contamination within 1 mile of the Harco Property consist of four CERCLIS facilities: Wilton Landfill (CTD980499537), Perkin Elmer Corporation (CTD082662289), Escambia Chemical Corporation (CTD981069214), and Town of Weston Landfill (CTD980521090). In addition, four facilities are regulated under RCRA within 1 mile of the property: Karian & Bleicher (CTD0016311605), Perkin Elmer Corporation Microlithography Division (CTD001453273), SVG Lithography Systems M S (CTD082662289), and Star Enterprise (CTD983874306) [32,33].

WASTE/SOURCE SAMPLING

On September 25, 1990, EPA Emergency Planning and Response Branch initiated a PA/SI at the Harco Property to determine the threat to the public and the environment by the wastes present at the property and to determine what removal action was most appropriate. During the investigation, performed by Weston, surface soil samples were collected from the sludge disposal area. The sample types included surface soil samples collected from 6 to 24 inches below ground surface and the contents from a drum found on the property [28]. As part of the PA/SI investigation, additional source surface soil samples were collected in January 1992 [29]. Table 3 summarizes the September 1990 source sampling results. Table 4 summarizes the source surface soil sampling results from the January 1992 sampling event. A compound or analyte is included in the tables if the concentration detected is greater than or equal to three times the background sample concentration. If the compound or analyte is not detected in the background sample the sample quantitation limit (SQL) or the sample detection limit (SDL) is used as a reference. The compound or analyte is included in the tables if the sample concentration is greater than the SQL or SDL. Sample location 80827 was used as the reference sample for the September 1990 sampling event, it is located in the southwest corner of the 2.0-acre clearing [28]. Sampling location 01668 was used as the reference sample for the January 1992 sampling event, it was collected from the north side of the 2.0-acre clearing (see Figure 4 and 4a: Sampling Locations From Previous Investigations) [29].

TABLE 3

Summary of Analytical Results
Surface Soil Sample Analysis for Harco Property
Collected by Weston in September 1990

Sample Location	Compound/Analyte	Concentration	Reference Concentration	Comments
80824 (Drum sample)	Methylene chloride	21 µg/g	0.4 µg/g	53 x REF
	Trichlorofluoromethane	64 µg/g	2.0 µg/g	32 x REF

TABLE 3 (continued)

Sample Location	Compound/Analyte	Concentration	Reference Concentration	Comments
80824 (continued)	1,1,2-Trichloro-1,2,2-trifluoroethane	42 µg/g	1.3 µg/g	32 x REF
	Xylenes (total)	340 µg/g	0.4 µg/g	850 x SQL
	Barium	120 mg/kg	32.6 mg/kg	3.7 x REF
	Cadmium	6.0 mg/kg	1.17 mg/kg	5 x SDL
	Chromium	273 mg/kg	8.12 mg/kg	33.6 x REF
	Lead	1,290 mg/kg	373 mg/kg	3.45 x REF
	Nickel	33.4 mg/kg	6.37 mg/kg	5.2 x REF
80825	Barium	99.2 mg/kg	32.6 mg/kg	3.0 x REF
	Cadmium	58.9 mg/kg	1.17 mg/kg	50.3 x SDL
	Copper	113 mg/kg	7.13 mg/kg	15.8 x REF
	Lead	8,520 mg/kg	373 mg/kg	22.8 x REF
	Zinc	47,600 mg/kg	912 mg/kg	52.2 x REF
80826	Barium	150 mg/kg	32.6 mg/kg	4.6 x REF
	Cadmium	4 mg/kg	1.17 mg/kg	3.4 x SDL
	Chromium	44 mg/kg	8.12 mg/kg	5.4 x REF
	Copper	940 mg/kg	7.13 mg/kg	130 x REF
	Lead	1,280 mg/kg	373 mg/kg	3.43 x REF
	Nickel	83 mg/kg	6.37 mg/kg	13 x REF
	Tin	14 mg/kg	2.92 mg/kg	4.8 x SDL
	Zinc	9,870 mg/kg	912 mg/kg	10.8 x REF
80828	Barium	110 mg/kg	32.6 mg/kg	3.4 x REF
	Cadmium	20 mg/kg	1.17 mg/kg	20 x SDL
	Copper	286 mg/kg	7.13 mg/kg	40.1 x REF

TABLE 3 (continued)

Sample Location	Compound/Analyte	Concentration	Reference Concentration	Comments
80828 (continued)	Lead	84,500 mg/kg	373 mg/kg	227 x REF
	Nickel	23.6 mg/kg	6.37 mg/kg	3.70 x REF
	Zinc	46,200 mg/kg	912 mg/kg	50.7 x REF
80829	Methylene chloride	0.5 µg/g	0.4 µg/g	1.2 x REF
	Barium	110 mg/kg	32.6 mg/kg	3.4 x REF
	Chromium	30.3 mg/kg	8.12 mg/kg	3.7 x REF
	Copper	35.9 mg/kg	7.13 mg/kg	5.0 x REF
	Lead	4,430 mg/kg	373 mg/kg	11.9 x REF

µg/g = micrograms per gram
mg/kg = milligrams per kilogram
SQL = sample quantitation limit
SDL = sample detection limit
REF = reference sample concentration
[28,29]

TABLE 4

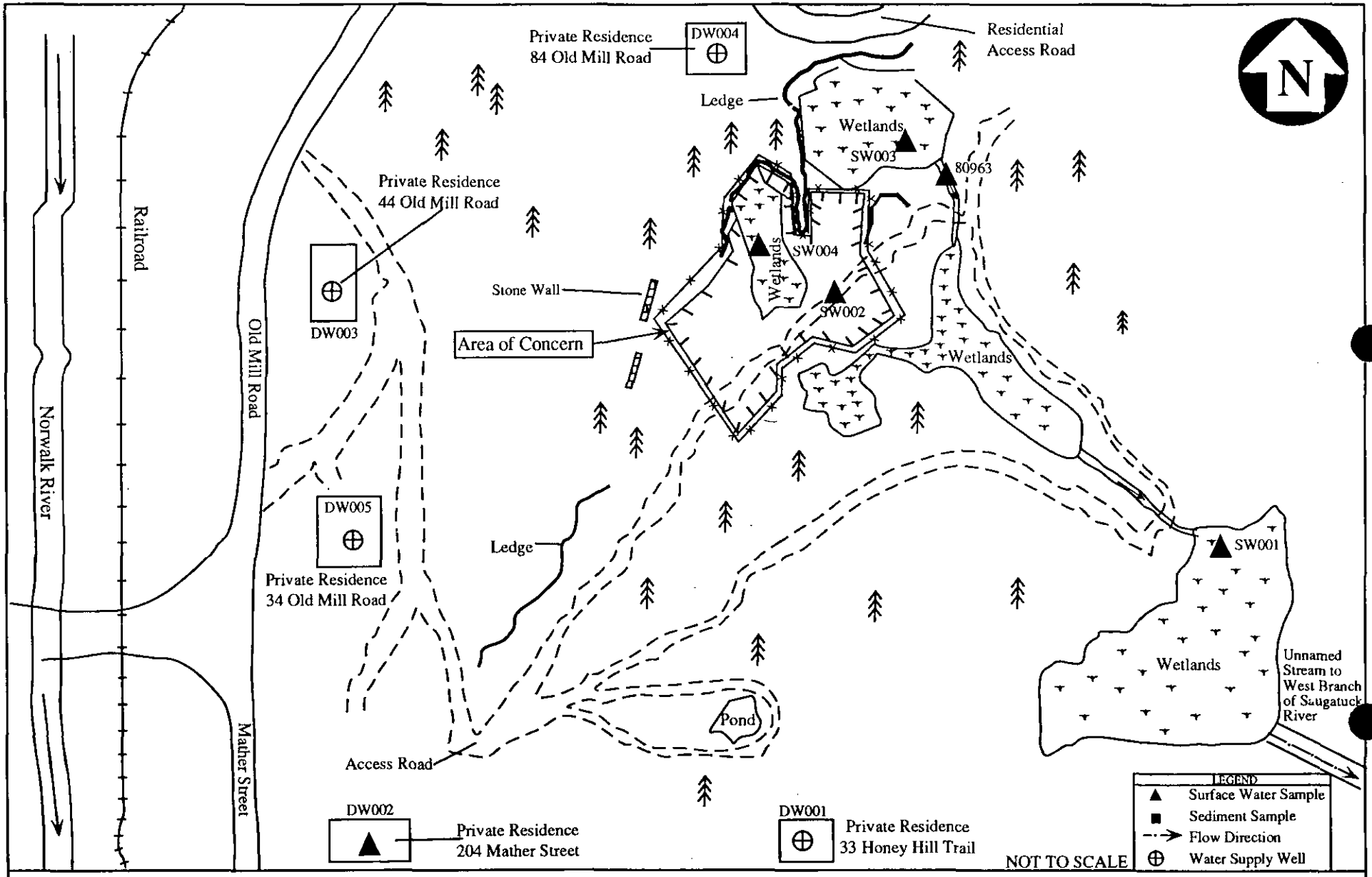
Summary of Analytical Results
Surface Soil Sample Analysis for Harco Property
Collected by Weston in January 1992

Sample Location	Analyte	Concentration (ppm)	Reference Concentration (ppm)	Comments
01663	Calcium	108,000	683	160 x REF
	Iron	184,000	30,800	6.0 x REF
	Lead	2,940	83	35 x REF
	Zinc	21,500	64	340 x REF
01664	Calcium	81,400	683	119 x REF

TABLE 4 (continued)

Sample Location	Analyte	Concentration (ppm)	Reference Concentration (ppm)	Comments
01664 (continued)	Iron	133,000	30,800	4.3 x REF
	Lead	3,300	83	39.8 x REF
	Zinc	20,200	64	315.6 x REF
01665	Calcium	41,900	683	61.3 x REF
	Iron	262,000	30,800	8.5 x REF
	Lead	6,680	83	80.5 x REF
	Zinc	30,200	64	471.9 x REF
01666	Calcium	7,400	683	10.8 x REF
	Lead	2,610	83	31.4 x REF
	Zinc	13,000	64	203.1 x REF
01667	Calcium	6,650	683	9.7 x REF
	Iron	101,000	30,800	3.3 x REF
	Lead	1,830	83	22.0 x REF
	Zinc	13,400	64	209.4 x REF

ppm= parts per million
REF= reference sample concentration
[28,29]



SAMPLING LOCATIONS FROM PREVIOUS INVESTIGATION
HARCO PROPERTY
WILTON, CONNECTICUT

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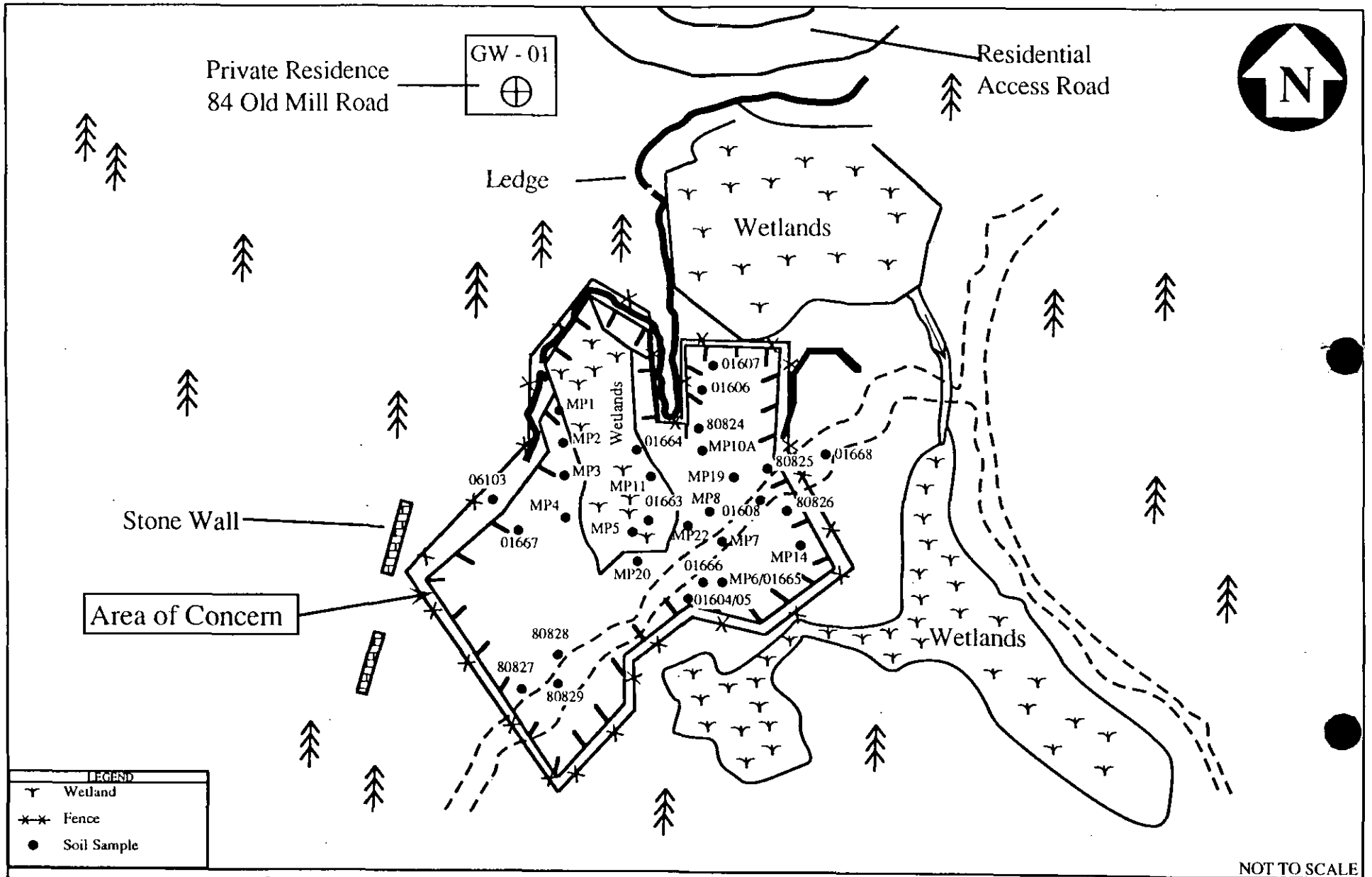
Figure 4



SAMPLING LOCATIONS FROM PREVIOUS INVESTIGATION
HARCO PROPERTY
WILTON, CONNECTICUT

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Figure 4a

EPA and Weston conducted a sampling survey at the Harco Property site to determine the extent of contamination. The survey was performed from March 30 to April 1, 1992. The sampling survey included setting up a sampling grid system, followed by the collection of surface soil samples for field screening for lead and zinc and confirmatory soil samples for lead and zinc [29]. An x-ray fluorescence (XRF) analyzer was used to screen the soil. The results revealed concentrations of lead and zinc ranging from 70 ppm to 10,000 ppm at a depth of 1.5 feet below ground surface. Surface soil samples at a depth of 1.5 feet were also collected from six locations at the Harco Property and analyzed for total metals using inductively coupled plasma (ICP) instrumentation. The analysis results detected elevated concentrations of calcium, copper, lead, nickel, and zinc. In addition, three surface soil samples were collected from the property and analyzed for arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium, silver, and zinc using the Toxicity Characteristic Leaching Procedure (TCLP) analysis. The analytical results showed only one analyte that exceeded the federal regulatory level for leaching concentrations: lead was detected in sample location 01607 at 27 mg/l, 5.4 times greater than the federal regulatory limit (5 mg/l). Table 5 summarizes the sampling results using the ICP analysis. An analyte is included in the table if the concentration detected was greater than or equal to three times the background sample concentration (01603) (see Figure 4 and 4a: Sampling Locations From Previous Investigations) [29].

TABLE 5

Summary of Analytical Results of Surface Soil Sample Analysis for Harco Property Collected by Weston in March 1992

Sample Location	Analyte	Concentration (ppm)	Reference Concentration (ppm)	Comments
01604	Calcium	68,900	14,400	4.78 x REF
	Copper	2,400	450	5.3 x REF
	Lead	3,340	670	5.0 x REF
	Zinc	19,700	4,970	3.96 x REF
01605	Calcium	51,700	14,400	3.59 x REF
	Copper	2,870	450	6.3 x REF
	Lead	4,350	670	6.5 x REF
	Nickel	160	48	3.3 x REF

TABLE 5 (continued)

Sample Location	Analyte	Concentration (ppm)	Reference Concentration (ppm)	Comments
01605 (continued)	Zinc	21,500	4,978	4.3 x REF
01606	Calcium	86,000	14,400	6.0 x REF
	Lead	8,900	670	13 x REF
01607	Cadmium	76	4	20 x REF
	Lead	11,400	670	17 x REF
	Zinc	84,400	4,970	17.0 x REF
01608	Cadmium	12	4	3.0 x REF
	Calcium	73,900	14,400	5.1 x REF
	Copper	1,500	450	3.3 x REF
	Lead	3,180	670	4.7 x REF
	Zinc	19,300	4,970	3.9 x REF

ppm = parts per million
REF = reference sample concentration
[29]

Table 6 summarizes the TCLP analysis results. A background sample was not collected for this sampling event. Samples 01603 and 01608 were collected from a depth of 24 inches, sample 01607 was collected from a depth of 12 inches [29].

TABLE 6

Summary of TCLP Analytical Results for Surface Soil Sample Analysis Collected in March 1992 by Weston

Sample Location	Analyte	Concentration (mg/l)	Federal Regulatory Level (mg/l)
01603	Lead	0.71	5.0
	Nickel	0.19	Not Established

Sample Location	Analyte	Concentration (mg/l)	Federal Regulatory Level (mg/l)
01603 (continued)	Zinc	49	Not Established
01607	Arsenic	1.0	5.0
	Barium	0.92	100.0
	Cadmium	0.46	1.0
	Lead	27.0	5.0
	Selenium	0.5	1.0
	Zinc	609	Not Established
01608	Arsenic	0.4	5.0
	Barium	0.24	100.0
	Cadmium	0.09	1.0
	Lead	0.43	5.0
	Nickel	0.34	Not Established
	Selenium	0.3	1.0
	Silver	0.24	5.0
	Zinc	72	Not Established

mg/l = milligrams per liter
[29]

From June 23 through June 25, 1992, Malcolm Pirnie contracted General Boring, Inc., to advance borings and collect subsurface soil samples at the Harco Property. All samples were analyzed for inorganic analytes, and only sample locations MP20 0-2 feet, and MP22 4-6 feet were analyzed for VOCs. All samples were collected at 2-foot intervals, ranging from 0 to 10 feet below ground surface. The reference sample used in this sampling event had sample collections from the 0 to 2 feet, 2 to 4 feet, and 6 to 8 feet intervals. No VOCs were detected in samples MP20 0-2 feet and MP22 4-6 feet [1,11]. Table 7 summarizes the soil sample analytical results. An analyte is included in the table if the concentration detected was greater than or equal to three times the background sample (MP12) concentration. If the analyte was not detected in the background sample the SDL was used as a reference. The analyte was included in the table if the sample concentration was greater than the SDL (see Figure 4 and 4a: Sampling Locations From Previous Investigations) [1].

TABLE 7

Summary of Analytical Results
Soil Sample Analysis for Harco Property
Collected by Malcolm Pirnie on June 23, 24, 25, 1992

Sample Location/ Depth	Analyte	Concentration (mg/kg)	Reference Concentration (mg/kg)	Comment
MP1/ 0-2 feet	Lead	101	19.1	5.29 x REF
	Zinc	760	73.5	10.3 x REF
MP1/ 2-3.8 feet	Lead	304	100	3 x REF
	Zinc	4,370	531	8.23 x REF
MP2/ 6-8 feet	Cadmium	2.0	0.39	5.1 x REF
	Copper	283	22.4	12.6 x REF
	Lead	414	15.0	27.6 x REF
	Zinc	2,300	96.1	24 x REF
MP3/ 0-2 feet	Lead	79.8	19.1	4.18 x REF
	Zinc	276	73.5	3.75 x REF
MP3/ 2-4 feet	Lead	521	100	5 x REF
MP4/ 0-2 feet	Lead	179	19.1	9.37 x REF
	Zinc	3,350	73.5	45.6 x REF
MP5/ 0-2 feet	Lead	1,620	19.1	84.8 x REF
	Zinc	11,400	73.5	155 x REF
MP6/ 2-4 feet	Lead	1,460	100	14.6 x REF
	Zinc	6,410	531	12.1 x REF
MP7/ 0-2 feet	Lead	161	19.1	8.43 x REF
	Zinc	1,050	73.5	14.3 x REF
MP7/ 6-8 feet	Zinc	596	96.1	6.20 x REF
MP8/ 0-2 feet	Lead	73.3	19.1	3.84 x REF

TABLE 7 (continued)

Sample Location/ Depth	Analyte	Concentration (mg/kg)	Reference Concentration (mg/kg)	Comment
MP8(continued)	Zinc	940	73.5	12.8 x REF
MP8/ 2-4 feet	Cadmium	5.6	0.38	15 x SDL
	Copper	5,710	37	150 x REF
	Iron	165,000	12,800	12.9 x REF
	Lead	2,000	100	20 x REF
	Zinc	14,800	531	27.9 x REF
MP10A/ 2-4 feet	Lead	6,910	100	70 x REF
	Zinc	20,600	531	38.8 x REF
MP10A/ 6-8 feet	Lead	1,140	15.0	76 x REF
	Zinc	2,280	96.1	23.7 x REF
MP11/ 0-2 feet	Zinc	374	73.5	5.08 x REF
MP11/ 2-4 feet	Lead	3,760	100	40 x REF
	Zinc	82,400	531	155 x REF
MP14/ 0-2 feet	Lead	1,290	19.1	67.5 x REF
	Zinc	24,500	73.5	333 x REF
MP19/ 0-2 feet	Lead	15,000	19.1	790 x REF
	Zinc	701	73.5	9.54 x REF
MP19/ 2-4 feet	Lead	13,300	100	100 x REF
MP19/ 6-8 feet	Lead	14,700	15.0	980 x REF
MP20/ 0-2 feet	Lead	164	19.1	8.59 x REF
	Zinc	9,670	73.5	132 x REF
MP22/ 0-2 feet	Lead	205	19.1	10.7 x REF
	Zinc	856	73.5	11.6 x REF

mg/kg = milligrams per kilogram

REF= Reference concentration

[1]

GROUNDWATER PATHWAY

The groundwater that lies beneath the Harco Property has a Connecticut water quality classification of GA which identifies groundwater that is known or presumed to be high quality groundwater suitable for private water supply. Depth to groundwater at the property is estimated to range from 0 to 3 feet. Groundwater flow near the Harco Property is influenced by the two surface water bodies. At the property, groundwater flows in a southern direction. Field measurements of test wells in the vicinity of the property established the depth to bedrock to be 40 to 60 feet. The bedrock is part of the Hartland and Gneiss Doe belts, Connecticut Valley synclinorium; it is characterized as porphyroblastic gniess. The surficial geology of the area consists of numerous, closely spaced outcrops separated by thin deposits of till. The soil type at the property is classified as Charlton fine sandy loam having a moderate to moderately rapid permeability [5].

Groundwater within 4 miles of the Harco Property is used by residents for drinking water from public and private wells [4,5]. The majority of the population within a 4-mile radius rely on private wells [5]. The nearest well is located 500 feet west of the disposal area [2,5]. This well supplies drinking water for Peter Harco, Jr. Within a 0.25-mile radius of the Harco Property, an estimated 88 people rely on private wells [7,19]. The nearest public water supply well is located outside of the 4-mile radius of concern [4]. There are five privately-owned public water supply sources within 4 miles of the Harco Property [4,5]. Table 8 lists these sources.

TABLE 8

Public Groundwater Supply Sources within 4 Miles of Harco Property

Distance/Direction From Facility	Source Name	Location of Source	Estimated Population Served	Source Type
2.48 miles Southwest	Tanners Drive	Wilton	32	Bedrock
3.12 miles Southeast	Weston Middle School	Weston	240	Bedrock
3.20 miles Southeast	Weston Middle School	Weston	241	Bedrock
3.36 miles Northwest	Acre Lane Inc.	Ridgefield	56	Bedrock
3.36 miles Northwest	Soundview Rural	Ridgefield	136	Bedrock

[4,5,18,20]

Table 9 lists the populations that receive drinking water from public and private sources located within each of the target distance rings. Frost Associates estimated the population served by private wells by summing the total number of drilled and dug wells within each CENTRACTS block (a cartesian data management system used by the census bureau) and multiplying this total by the average number of people in each household. According to Frost Associates, there are approximately 2.6 people per household in Wilton [7].

TABLE 9

Estimated Drinking Water Populations Served by Groundwater Sources within 4 Miles of Harco Property

Radial Distance From Harco Property (miles)	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population
0.00 - 0.25	88	0	88
>0.25 - 0.50	254	0	254
>0.50 - 1.0	1,073	0	1,073
>1.00 - 2.00	3,989	0	3,989
>2.00 - 3.00	6,942	32	6,974
>3.00 - 4.00	7,020	673	7,693
TOTAL	19,366	705	20,071

[4,5,7,19]

In March 1992, Weston collected drinking water samples from five residences near the Harco Property; the samples were collected as part of the Extent of Contamination Survey. The samples were analyzed using ICP instrumentation for inorganic analytes. Zinc was detected at three residences with concentrations of 35 ppm, 42 ppm, and 91 ppm. Nickel was detected at the residence of 34 Old Mill Road at a concentration of 4 ppb; this concentration is 25 times less than the federal drinking water standard [29]. Table 10 summarizes the drinking water analytical results. An analyte is included in the table if the concentration detected is greater than or equal to three times the background concentration. If the SDL or SQL for a sample was not reported, and an the analyte is not detected in the background sample, the federal drinking water standard (Maximum Contaminant Levels [MCLs]) for that analyte was used as a reference (see Figure 4 and 4a: Sampling Locations From Previous Investigations).

TABLE 10

Summary of Analytical Results of Drinking Water Sample Analysis for Harco Property Collected by Weston in March 1992

Sample Location	Analyte	Concentration (ppb)	Reference Concentration (ppb)	Remarks
DW001	Zinc	91	Not established	*
DW002	Zinc	35	Not established	*
DW003	Zinc	42	Not established	*

*Note: All concentrations detected are less than all health advisories set under the federal Maximum Contaminant Level standards.
ppb = parts per billion
[29,31]

On June 22, 1994, CDM collected drinking water samples from 5 residences near the Harco Property (see Figure 3: CDM Sampling Locations) [2]. The samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and inorganic analytes [23,25,26]. The VOCs were analyzed by Special Analytical Services, using EPA Method 524.2 from *Methods for the Determination of Organic Compounds in Drinking Water*, EPA-600/4-88/039, December 1988, modified for Region I. Method 524.2 was used because of its lower detection limits and the additional target compounds applicable to drinking waters. The lower detection limits for these analytical results enable comparison to the MCL.

The remaining fractions were analyzed under Routine Analytical Services (RAS). No VOCs, SVOCs, pesticides, or PCBs were detected in the samples analysis. Several inorganic analytes were detected in the samples; however, only two analytes were detected above background concentrations [23,25,26]. Table 11 provides a sample summary of the groundwater samples collected by CDM for the Harco Property. Table 12 summarizes the drinking water analytical results collected by CDM. An analyte is included in the table if the concentration detected is greater than or equal to three times the background concentration. If the analyte is not detected in the background sample (GW-01), the SDL is used as a reference. The analyte is included in the table if the sample concentration is greater than the SDL. A complete listing of analytical results is provided in Attachment A [23,25,26]. Sample analysis of reference sample GW-01 detected tetrachloroethylene (3.0 μg/l); this was the only VOC detected in the sample. Tetrachloroethylene was never detected during previous investigations. CDM has concluded that the presence of tetrachloroethylene in GW-01 was potentially caused by another source (i.e., laboratory contaminant).

TABLE 11

Sample Summary: Harco Property
Samples Collected by CDM on June 22, 1994

Sample Location Number	Traffic Report #	Time (hrs)	Remarks/ Depth	Sample Source
GW-01	SAB831 (O) SAB832 (Oa) SAB833 (I)	2130	Tap water grab	Private residence west of property
GW-02	SAH519 (O) SAH520 (Oa) SAH521 (I)	1930	Tap water grab	Private residence west of property
GW-03	SAB834 (O) SAB835 (Oa) SAB836 (I)	2000	Tap water grab	Private residence southwest of property
GW-04	SAB837 (O) SAB838 (Oa) SAB839 (I)	2000	Tap water grab	Private residence southwest of property
TB-SA	SAH526 (O)	1105	Grab	Trip blank, SAS

O= volatile organic compounds
Oa= semivolatile organic compounds
I= Inorganic
SAS= Special Analytical Services
[2,23,24,25,26,27]

TABLE 12

Summary of Analytical Results
Drinking Water Sample Analysis for Harco Property
Collected by CDM on June 22, 1994

Sample Location	Analyte	Concentration (µg/l)	Reference Concentration (µg/l)	Maximum Contaminant Level	Remarks
GW-02	Copper	8.5 J	4.5 U	1.3	1.9 x SDL
GW-02	Zinc	25.3 J	9.2 UJ	Not Established	2.8 x SDL

µg/l= micrograms per liter
SDL= sample detection limit
J= The associated numerical value is an estimated quantity.
U= The analyte was not detected. The associated numerical value is the analyte detection limt.
UJ= The analyte was not detected. The analyte detection limit is an estimated value.
[23,25,26]

Copper and zinc were detected in source soil samples collected at Harco Property during previous investigations [29]. The concentrations detected in groundwater are below all federal drinking water standards and health advisories [31]. The concentrations detected in the groundwater are approximately 10,000 times less than the concentrations in the source samples [23,25,26,28,29].

SURFACE WATER PATHWAY

A major drainage basin divide runs north/south across the property near the disposal area. The two resulting surface water drainage pathways are totally separate within 15 miles downstream of their respective probable points of entry (PPE). The property does not lie within a floodplain [5].

Precipitation falling on the west side of the divide travels an overland flow distance of approximately 700 feet to PPE1, at the Norwalk River [5]. The Norwalk River in Wilton flows south at an average flow rate of 57.2 cubic feet per second and empties 15 miles downstream into Norwalk Harbor and Long Island Sound [36].

Precipitation falling on the eastern part of the property flows into the farthest southeast wetland at PPE2, the wetland drains to form a unnamed stream. This stream feeds the West Branch of the Saugatuck River, 3,000 feet downstream of PPE2 [2,35]. The West Branch converges with the Saugatuck River 9.0 miles downstream from PPE2. Approximately 6.0 miles further downstream, the Saugatuck River flows to its mouth near Westport, Connecticut, where it

empties into Long Island Sound [35]. Table 13 lists the water bodies within the 15-mile surface water segments.

TABLE 13

Water Bodies Within the Surface Water Segment of Harco Property

Surface Water Body	Descriptor[a]	Length of Reach	Flow Characteristics (cfs)[b]	Length of Wetlands
Norwalk River	Small to moderate stream	15 miles	57.2	None identified
West Branch of the Saugatuck River	Small to moderate stream	8.5 miles	34	0.5 mile
Saugatuck River	Small to moderate stream	6.5 miles	45	2,000 feet

[a] Minimal stream. Small to moderate stream. Moderate to large stream. Large stream to river. Very large river. Coastal tidal waters. Shallow ocean zone or Great Lake. Deep ocean zone or Great Lake. Three-mile mixing zone in quiet flowing river.
[35,36]

There are no drinking water intakes located within 15 downstream miles of PPE1. The Norwalk River has a Connecticut water quality classification of B, which classifies the surface waters to be used for recreational uses, fish and wildlife habitat, and agricultural and industrial supply. There are no wetlands along the surface water pathway, from the Harco Property, of the Norwalk River. There are no known federally endangered or threatened species or Connecticut "Species of Special Concern" along the 15-mile downstream pathway [5].

There are no drinking water intakes located within 15 downstream miles of PPE2. The West Branch of the Saugatuck River has a Connecticut water quality classification of A, which classifies the surface waters as high quality waters used as a potential water supply, fish and wildlife habitat, recreational use, and agricultural and industrial supply. The Saugatuck River has a Connecticut water quality classification of B/A which changes to SB/SA near its mouth. A classification of B/A indicates that the surface water is threatened by a source of pollution. Class SB/SA surface waters are high quality coastal and marine water with designated uses for marine fish, shellfish, and wildlife habitats [5]. Wetlands are located between the Harco Property and the West Branch of the Saugatuck River [2,30]. The wetlands consist of 13.75 acres with 4,500 feet of frontage [2,5,15,28,29,30]. There are wetlands along the West Branch of the Saugatuck River (0.5 mile frontage), 1.7 miles downstream of PPE2, near Godfrey Pond [5]. There are also wetlands along the Saugatuck River (2,000 feet frontage), 10.4 miles

downstream of PPE2, near Gorham Island. There are no known populations of federally endangered and threatened species or Connecticut "Species of Special Concern" within the 15-mile downstream pathway [5].

During the September 25, 1990, PA/SI performed by Weston, a surface water sample (sample # 80963) was collected from the unnamed stream that flows from the northeast wetlands to the wetlands located immediately southeast of the fenced area. The sample was analyzed using the ICP instrumentation. The analysis detected concentrations of barium (0.142 ppm), lead (0.981 ppm), and zinc (9.07 ppm) in the surface water sample. A background sample was not collected to compare the concentrations to a reference concentration [28].

During the March 30, 1992, Extent of Contamination Survey performed by Weston, three surface water samples were collected from the wetlands at the Harco Property and one surface water sample from an overland path between the wetlands (see Figure 4 and 4a: Sampling Location From Previous Investigations). A background sample was not collected to compare the concentrations to a reference concentration. The sample analytical results detected the greatest concentration of lead in the surface water sample (SW002), collected from the overland path within the 2.0-acre fenced area. This sample also contained the largest concentrations of calcium, iron, and zinc. Calcium and iron were detected in all three of the wetlands surface water samples; however, zinc was not detected in the downstream wetland [29]. Table 14 provides a sample analysis summary of the surface water samples collected during the PA/SI investigation.

TABLE 14

Summary of Analytical Results
Surface Water Sample Analysis for Harco Property
Collected by Weston on March 30, 1992

Sample Location	Analyte	Concentration (ppb)
SW001	Aluminum	94
	Barium	24
	Calcium	15,530
	Iron	377
	Magnesium	2,650
	Manganese	29
SW002	Aluminum	619

TABLE 14 (continued)

Sample Location	Analyte	Concentration (ppb)
SW002 (continued)	Barium	82
	Calcium	55,350
	Iron	10,930
	Lead	90
	Magnesium	4,980
	Manganese	450
	Zinc	2,780
SW003	Aluminum	108
	Barium	55
	Calcium	51,520
	Iron	2,880
	Magnesium	6,880
	Manganese	619
	Zinc	180
SW004	Aluminum	140
	Barium	63
	Calcium	37,400
	Cobalt	4
	Iron	6,490
	Magnesium	3,980
	Manganese	735
	Zinc	447

ppb= parts per billion
[29]

On June 23, 1992, CTDEP collected surface water samples from an unnamed stream that flows from the property into the West Branch of the Saugatuck River. Analysis of the surface water samples revealed concentrations of lead with a range of 0.007 mg/l to 0.039 mg/l [4]. Surface water samples were collected downstream of Harco Property, at Samuelson Road, contained concentrations of lead that were approximately 10 times higher than the concentrations of lead in surface water at the Harco Property. On June 30, 1992, CTDEP completed a benthic assessment of the unnamed stream to assess the water quality of the stream. The study concluded that the benthic macroinvertebrate community observed at the Harco Property appeared to be non-impaired by the wastes disposed of at the property and therefore concluded that the water quality was fair [37].

On June 22, 1994, CDM collected surface water and sediment samples from the wetlands at the Harco Property (see Figure 3: CDM Sampling Locations). Six surface water and nine sediment samples were collected. Surface water sampling results identified the presence of inorganic analytes; sediment sampling results identified the presence of VOCs, pesticides, and inorganic analytes. All sediment samples were collected from a depth of 6 inches. All surface water and sediment samples, except for SW-10 and SW-11, were submitted for full TCL and TAL analysis through the EPA CLP RAS [2,24,27].

Surface Water Inorganic Analytes CLP Data:

A total of three inorganic analytes were detected among sample locations SW-01, SW-02, SW-06, SW-07, and SW-09. Calcium was detected in four of the five samples at concentrations ranging from 21,700 to 25,300 µg/l. Manganese was detected in all five samples from 236 to 840 µg/l. Iron was detected only in SW-01. No other analytes were detected significantly above background concentrations [24].

Sediment Volatile Organic CLP Data:

One VOC was detected in sample location SD-01, collected from the wetland located within the 2.0-acre fenced-in area: toluene (290J µg/kg). This compound was analyzed for in previous sampling events but it was not detected [27].

Sediment Pesticide/PCB CLP Data:

Two pesticides were detected at sample location SD-01: 4,4'-DDE (40 µg/kg) and alpha-chlordane (51 µg/kg). These compounds were not analyzed for in previous sampling events [27].

Sediment Inorganic Analytes CLP Data:

A total of 18 inorganic analytes were detected among sample locations SD-01, SD-02, SD-03, SD-04, and SD-08. Sample location SD-02 had the greatest number of analytes detected, a total of 13: aluminum (22,700 mg/kg), arsenic (7.0 mg/kg), chromium (31.5J mg/kg), cobalt (10.8

mg/kg), copper (32.3 mg/kg), iron (25,000 mg/kg), lead (73.4 mg/kg), magnesium (4,070 mg/kg), manganese (155 mg/kg), nickel (15.3 mg/kg), potassium (1,270 mg/kg), vanadium (44.2 mg/kg), zinc (227 mg/kg) [24].

Source soil samples collected at the Harco Property from previous investigations identified similar inorganic analytes at elevated levels. Barium, cadmium, calcium, chromium, copper, iron, nickel, and zinc were detected in the source samples at concentrations that are greater than or equal to the surface water and sediment sample concentrations. Calcium and iron were the two highest concentrations detected in the sediment and surface water samples at SW-01/SD-01 and SW-02/SD-02. The sampling locations are adjacent to the area where 800 cubic yards of iron oxide, lime, and calcium sulfate were disposed [2,29].

Table 15 provides a sample summary of the surface water and sediment samples collected by CDM at the Harco Property. Table 16 summarizes the surface water inorganic analytical results and Table 17 summarizes the sediment analytical results. The sample analytical results summary tables include all compounds or analytes detected at a concentration greater than or equal to three times the background sample (SW-05, SD-05) concentration. If the compound or analyte was not detected in the background sample, the background SQL or SDL for that compound or analyte is used as a reference. A complete listing of analytical results is provided in Attachments B and C [2,24,27].

TABLE 15

Sample Summary: Harco Property
Surface Water and Sediment Samples Collected by CDM on June 22, 1994

Sample Location Number	Traffic Report #	Time (hrs)	Remarks/ Depth	Sample Source
SW-10	SAB828 (O) SAB829 (Oa) SAB830 (I)	2100	Grab from spring at private residence	Private residence south of property
SW-11	SAB825 (O) SAB826 (Oa) SAB827 (I)	1530	Grab 3 inches	Northeast side of northern wetlands
SD-01	AHJ80 (O) MAFL93 (I)	1200	Grab 6 inches	North side of wetlands enclosed within the fence
SD-02	AHJ81 (O) MAFL94 (I)	1130	Grab 6 inches	South side of wetlands enclosed within the fence

TABLE 15 (continued)

Sample Location Number	Traffic Report #	Time (hrs)	Remarks/ Depth	Sample Source
SD-03	AHJ82 (O) MAFL95 (I)	1300	Grab 6 inches	South side of northern wetlands
SD-04	AHJ83 (O) MAFL96 (I)	1500	Grab 6 inches	Northwest side of northern wetlands
SD-05	AHJ84 (O) MAFL97 (I)	1400	Grab 6 inches	Northeast side of northern wetlands, reference sample
SD-06	AHJ85 (O) MAFL98 (I)	1600	Grab 6 inches	Stream which connects wetlands
SD-07	AHJ86 (O) MAFL99 (I)	1600	Grab 6 inches	Stream which connects wetlands
SD-08	AHJ87 (O) MAFM00 (I)	1730	Grab 6 inches	Wetlands southeast of fenced area
SD-09	AHJ88 (O) MAFM01 (I)	1800	Grab 6 inches	Wetlands southeast of fenced area
SW-01	AHJ89 (O) MAFM02 (I)	1200	Grab 6 inches	North side of wetlands enclosed in the gate
SW-02	AHJ90 (O) MAFM03 (I)	1130	Grab 6 inches	South side of wetlands enclosed in the gate
SW-05	AHJ93 (O) MAFM06 (I)	1400	Grab 3 inches	Northeast side of northern wetlands, reference sample
SW-06	AHJ94 (O) MAFM07 (I)	1600	Grab 3 inches	Stream which connects wetlands
SW-07	AHJ95 (O) MAFM08 (I)	1800	Grab 3 inches	Stream which connects wetlands
SW-09	AHJ97 (O) MAFM10 (I)	1400	Grab 6 inches	Wetlands southeast of fenced area

O= volatile organic compounds
Oa= semivolatile organic compounds
I= Inorganic
RAS= Routine analytical Services
[2,23,24,25,26,27]

TABLE 16

Summary of Inorganic Analytical Results of Surface Water Sample Analysis for Harco Property Collected by *CDM on June 22, 1994*

Sample Location Traffic Report No.	Analyte	Concentration (μg/l)	Reference Concentration (μg/l)	Comment
SW-01 MAFM02	Iron	10,500J	3,370J	3.1 x REF
	Manganese	236	62.1	3.80 x REF
SW-02 MAFM03	Calcium	25,300	6,900	3.7 x REF
	Manganese	723	62.1	11.6 x REF
SW-06 MAFM07	Calcium	22,100	6,900	3.2 x REF
	Manganese	620	62.1	10.0 x REF
SW-07 MAFM08	Calcium	21,700	6,900	3.1 x REF
	Manganese	562	62.1	9.05 x REF
SW-09 MAFM10	Calcium	23,500	6,900	3.4 x REF
	Manganese	840	62.1	14 x REF

J= The associated numerical value is an estimated quantity.
μg/l= *micrograms per liter*
REF= Reference sample concentration.
[27]

TABLE 17

Summary of Analytical Results of Sediment Sample Analysis for Harco Property Collected by CDM on June 22, 1994

Sample Location Traffic Report No.	Compound/ Analyte	Concentration	Reference Concentration	Comment
SD-01 AHJ80	Toluene	290J µg/kg	26U µg/kg	11 x SQL
	4,4'-DDE	40 µg/kg	7.3U µg/kg	6 x SQL
	alpha-Chlordane	51 µg/kg	7.3U µg/kg	7.0 x SQL
SD-01 MAFL93	Arsenic	4.3J mg/kg	1.4U mg/kg	3.1 x SDL
	Cadmium	1.1J mg/kg	0.83UJ mg/kg	1.3 x SDL
	Cobalt	8.5J mg/kg	2.0UJ mg/kg	4 x SDL
	Copper	32.2J mg/kg	8.3 mg/kg	3.9 x SDL
	Iron	16,100J mg/kg	1,410 mg/kg	11.4 x REF
	Lead	150J mg/kg	16.3 mg/kg	9.2 x REF
	Magnesium	3,160J mg/kg	548 mg/kg	5.8 x REF
	Sodium	250J mg/kg	15.7 mg/kg	16 x SDL
	Vanadium	36.4J mg/kg	7.1 mg/kg	5.1 x REF
	Zinc	268J mg/kg	35.8 mg/kg	7.49 x REF
SD-02 MAFL94	Aluminum	22,700 mg/kg	6,650 mg/kg	3.4 x REF
	Arsenic	7.0 mg/kg	1.4U mg/kg	5 x SDL
	Chromium	31.5J mg/kg	7.1J mg/kg	4.4 x REF
	Cobalt	10.8 mg/kg	2.0UJ mg/kg	5.4 x SDL
	Copper	32.3 mg/kg	8.3 mg/kg	3.9 x REF
	Iron	25,000 mg/kg	1,410 mg/kg	18 x REF
	Lead	73.4 mg/kg	16.3 mg/kg	4.50 x REF
	Magnesium	4,070 mg/kg	548 mg/kg	7.4 x REF

TABLE 17 (continued)

Sample Location Traffic Report No.	Compound/ Analyte	Concentration	Reference Concentration	Comment
SD-02 (continued)	Manganese	155 mg/kg	15.7 mg/kg	9.87 x REF
	Nickel	15.3 mg/kg	4.2U mg/kg	3.4 x SDL
	Potassium	1,270 mg/kg	291 mg/kg	4.36 x REF
	Vanadium	44.2 mg/kg	7.1 mg/kg	6.2 x REF
	Zinc	227 mg/kg	35.8 mg/kg	6.34 x REF
SD-03 MAFL95	Calcium	8,310J mg/kg	2,290J mg/kg	3.63 x REF
	Cobalt	4.4J mg/kg	2.0UJ mg/kg	2.2 x SDL
	Iron	4,500J mg/kg	1,410 mg/kg	3.2 x REF
	Manganese	126J mg/kg	15.7 mg/kg	8.0 x REF
	Mercury	0.27J mg/kg	0.13U mg/kg	2.1 x SDL
	Potassium	992J mg/kg	291 mg/kg	3.2 x REF
	Zinc	153J mg/kg	35.8 mg/kg	4.3 x REF
SD-04 MAFL96	Barium	360J mg/kg	111J mg/kg	3.2 x REF
	Cadmium	4.4 mg/kg	0.83UJ mg/kg	5.3 x SDL
	Cobalt	4.2 mg/kg	2.0UJ mg/kg	2.1 x SDL
	Iron	4,680 mg/kg	1,410 mg/kg	3.3 x REF
	Magnesium	2,340 mg/kg	548 mg/kg	4.7 x REF
	Manganese	56.7 mg/kg	15.7 mg/kg	3.6 x REF
	Nickel	22.1 mg/kg	4.2U mg/kg	5.3 x SDL
SD-08 MAFM00	Cobalt	9.6 mg/kg	2.0UJ mg/kg	4.8 x SDL
	Iron	15,300 mg/kg	1,410 mg/kg	10.9 x REF
	Manganese	198 mg/kg	15.7 mg/kg	12.6 x REF
	Magnesium	3,700 mg/kg	548 mg/kg	6.7 x REF

TABLE 17 (continued)

Sample Location Traffic Report No.	Compound/ Analyte	Concentration	Reference Concentration	Comment
SD-08 (continued)	Nickel	14.4 mg/kg	4.2U mg/kg	3.4 x SDL
	Potassium	2,560 mg/kg	291 mg/kg	8.8 x REF
	Vanadium	28.1 mg/kg	7.1 mg/kg	4.0 x REF
	Zinc	109 mg/kg	35.8 mg/kg	3.0 x REF
SD-09 MAFM01	Iron	5,920 mg/kg	1,410 mg/kg	4.20 x REF
	Manganese	89.8 mg/kg	15.7 mg/kg	5.72 x REF
	Potassium	1,090 mg/kg	291 mg/kg	3.75 x REF

J= The associated numerical value is an estimated quantity.
U= The compound was analyzed for but not detected. The associated numerical value is the sample quantitation limit.
UJ= The compound was analyzed for but was not detected. The sample quantitation/detection limit is an estimated quantity.
REF= Reference sample concentration
SDL= Sample detection limit
SQL= Sample quantitation limit
μg/kg= micrograms per kilograms
mg/kg= milligrams per kilograms
[24]

On June 22, 1994, CDM collected a drinking water sample (SW-10) from a residential well which is supplied drinking water from a surface water intake of a natural forming spring. The sampling results detected copper (7.8J μg/l), lead (4.5J μg/l), and zinc (15.0J μg/l) at concentrations greater than background groundwater drinking water concentrations but not greater than surface water background concentrations. The MCLs for copper, lead, and zinc are 1,300 μg/l, 15 μg/l, and not established for zinc [31,34]. The intake supplies drinking water for three people [22].

SOIL EXPOSURE PATHWAY

The only known potential sources for soil contamination at the Harco Property are the estimated 24,000 cubic yards of contaminated soil resulting from the mixture of 800 cubic yards of iron oxide, lime, and calcium sulfate with onsite soils [1,6,11]. During the April 26, 1994 site reconnaissance and June 22, 1994 sampling event, the CDM field team observed orange stained soil throughout the fenced-in 2.0-acre area [2].

In September 1990, during the PA/SI investigation, EPA collected six surface soil samples at the Harco Property. All samples were located within the current fenced in 2.0-acre area. The sample analysis results identified elevated concentrations of six inorganic analytes [28]. Additional source surface soil samples were collected during the March 1992 Extent of Contamination Survey and the June 1992 Malcolm Pirnie investigation [1,29]. Both events confirmed and added to the extent of inorganic contamination at the Harco Property; see the Waste/Source Sampling section for the sampling results summary for all of the investigations.

On June 23, 1992, Northeast Soils, Inc. was contracted by EPA to perform an inland wetlands soil identification. The study identified approximately 600 square feet of wetlands within the 2.0-acre fenced-in area. The wetlands soil consisted of Carlisle muck; Ridgebury, Leicester, and Whitman extremely stony fine sandy loams; and Udorthents, smoothed wet [15].

Access to the property is unrestricted; however, a 4-foot fence that surrounds the 2.0-acre clearing, the area of disposal, restricts access. No business establishments exist at the Harco Property; therefore no employees enter the property. The nearest residence is located approximately 500 feet west of the 2.0-acre fenced-in area, at 44 Old Mill Road [2]. The nearest school is the Weston Middle School located approximately 3.0 miles southeast of the property [5].

AIR PATHWAY

Air sampling was not conducted at the Harco Property. During the April 26, 1994 site reconnaissance, and the June 22, 1994 sampling event, a 580B organic vapor monitor was used to measure the level of VOCs in the ambient air. No VOCs were detected during either activity. There are no records of any air permits or applications for Harco Property at the CTDEP. The population within 4 miles of the property is approximately 22,958 [7]. Table 18 lists the population by radial distance from the property.

TABLE 18

Estimated Population Within 4 Miles of Harco Property

Radial Distance From Harco Property (miles)	Estimated Population
0.00 - 0.25	91
>0.25 - 0.50	266
>0.50 - 1.00	1,086
>1.00 - 2.00	4,075
>2.00 - 3.00	7,278

TABLE 18 (continued)

Radial Distance From Harco Property (miles)	Estimated Population
>3.00 - 4.00	10,162
TOTAL	22,958

[7]

Sensitive environments located within 4 miles of the Harco Property include one threatened species, three endangered species, and three state special concern species [12]. Table 19 lists the species by radial distance from the property.

TABLE 19

Sensitive Environments Within 4 Miles of Harco Property

Radial Distance From Harco Property (miles)	Species	Status
0.00 - 0.25	Wetlands (2.5 acres)	--
>0.25 - 0.50	None identified	--
>0.50 - 1.00	goldies fern (*Dryopteris goliana*)	Federal and state threatened
>1.00 - 2.00	None identified	--
>2.00 - 3.00	None identified	--
>3.00 - 4.00	swap birch (*Betula pumila*)	State special concern
	Sisyra fuscata	State special concern
	dion skipper (*Euphyes dion*)	State special concern
	lizard's tail (*Saururus cernuus*)	Federal and state endangered
	broadwing sedge (*Carex alata*)	Federal and state endangered
	toothcup (*Rotala ramosior*)	Federal and state endangered

[12]

SUMMARY

The Harco Property is located at 44 Old Mill Road in Wilton, Fairfield County, Connecticut. The property consists of a 41.1-acre parcel of heavy vegetation in which 2.0 acres of the land are cleared. The 2.0-acre clearing consists of shrubs, bushes, and wetlands. The property is bordered by the Machala residence and woodlands to the north, an area of wetlands and the West Branch of the Saugatuck River to the east, the Caggino residence and Honey Hill Road to the south, and the Harco, McGarry and Kelly residences to the west. No structures or buildings have been established at the property. A chain-link fence encloses the 2.0-acre area. Within the fence is a depression approximately 10 feet in depth. Water collected in the depression drains toward the west. Surface water runoff occurs after a considerable amount of precipitation has collected in the depression. Wetlands located to the north of the depression create an unnamed stream that flows southeast toward the West Branch of the Saugatuck River.

The 39.1 acres of the 41.1-acre parcel are currently owned by Costa Stergue, and the remaining 2.0 acres is owned by Thomas King. From 1923 to 1987, the Harco Property was owned by Peter Harco, Sr., and other members of the Harco family. It was used by the Harcos as a quarry for the mining of silver for approximately one year, and a dumping area for the remaining 63 years. In November 1970, the state of Connecticut Water Resources Commission and the town of Wilton Planning and Zoning Commission granted a permit to Gilbert & Bennett Manufacturing Company for the disposal of 800 cubic yards of dried iron oxide, lime, and calcium sulfate without treatment to the Harco Property. The Gilbert & Bennett Manufacturing Company produces steel wire rods that require acid cleaning. Iron oxide, lime, and calcium sulfate are by-products of the treatment process used by the Gilbert & Bennett Manufacturing Company.

On July 17, 1979, the Connecticut Department of Health and Wilton Board of Health inspectors performed a site inspection of the property. The two boards recommended the removal of waste material at the property. From 1982 to 1985, the Town of Wilton zoning office issued Peter Harco Sr. three "Cease and Desist orders" to stop future dumping activities at the property.

The U.S. Environmental Protection Agency (EPA) entered the Harco Property into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on August 2, 1990 and the EPA Emergency Planning and Response Branch initiated a Preliminary Assessment/Site Investigation (PA/SI) on September 25, 1990 in response to Senator Joseph Lieberman's concern. The PA/SI was performed by Roy F. Weston (Weston). Sampling during the investigation identified high concentrations of lead and zinc in the soil and surface water at the property. On March 30, 1992, an Extent of Contamination Survey was performed at the Harco Property by Weston for the EPA. During this investigation, samples were collected from surface soil, surface water and, breakout water from the Harco Property; and nearby residents' private wells used for drinking water. The results from this survey indicated the presence of lead and zinc at elevated concentrations in the surface soil samples at an estimated depth of 1.5 feet.

From June 23, 1992 through June 25, 1992, Gilbert & Bennett Manufacturing Company contracted Malcolm Pirnie, Inc. to characterize the extent of contamination at the Harco Property. Subsurface soil samples were collected and analyzed for volatile organic compounds (VOCs) and inorganic analytes. The sample results detected similar elevated concentrations of lead and zinc as detected in the EPA Extent of Contamination Survey but at sample depths of up to 8 feet below ground surface.

On April 26, 1994, CDM conducted an onsite reconnaissance. Activities conducted included a meeting with Paul Groulx (EPA On-scene Coordinator) and a walk-over of the property. On June 22, 1994, CDM collected surface water and sediment samples at the Harco Property and drinking water samples from nearby residences.

The groundwater that lies beneath the Harco Property has a Connecticut water quality classification of GA. Class GA identifies groundwater that is known or presumed to be high quality groundwater suitable for private water supply. Depth to groundwater at the property is estimated to range from 0 to 3 feet. Groundwater flow near the Harco Property flows in a southern direction. Field measurements of test wells in the vicinity of the property established the depth to bedrock to be 40 to 60 feet. Groundwater within 4 miles of the Harco Property is used by residents for drinking water from public and private wells. The majority of the population within a 4-mile radius relies on private wells. The nearest well is located 500 feet west of the disposal area. This well supplies drinking water for the Harco resident. Within a 0.25-mile radius of the Harco Property a total of 88 people rely on private wells. The nearest public water supply well is located outside of the 4-mile radius of concern. There are five privately-owned public water supply sources within 4 miles of the Harco Property.

In March 1992, Weston collected drinking water samples from five residences near the Harco Property. The samples were analyzed for inorganic analytes. Zinc was detected at three residences with concentrations of 35 parts per million (ppm), 42 ppm, and 91 ppm. Nickel was detected at the residence at 34 Old Mill Road at a concentration of 4 ppb, this concentration is 25 times less than the federal drinking water standard. On June 22, 1994, CDM Federal Programs Corporation (CDM) collected drinking water samples from five residences near the Harco Property. The samples were analyzed for VOCs, semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyl (PCBs), and inorganic analytes. Several inorganic analytes were detected in the samples; however, only two analytes were detected above background concentrations from one drinking water well, copper (8.5J micrograms per liter (μg/l)), and zinc (25.3J μg/l).

A major drainage basin divide runs north/south across the property near the disposal area. The two resulting surface water drainage pathways are totally separate within 15 miles downstream of their respective probable points of entry (PPE). Precipitation falling on the west side of the divide travels an overland flow distance of approximately 700 feet to PPE1, at the Norwalk River. The Norwalk River in Wilton flows south with an average flow rate of 57.2 cubic feet per second and empties 15 miles downstream into Norwalk Harbor and Long Island Sound. Precipitation falling on the eastern part of the property flows into the wetlands and drains into

a unnamed stream at PPE2. This stream feeds the West Branch of the Saugatuck River, 3,000 feet from PPE2. The West Branch converges with the Saugatuck River 9.0 miles downstream from PPE2. Approximately 6.0 miles further downstream the Saugatuck River flows to its mouth near Westport, Connecticut, where it empties into Long Island Sound.

During the September 25, 1990 PA/SI investigation, Weston collected a surface water sample from an unnamed stream at the Harco Property. The sample analysis detected concentrations of barium (0.142 ppm), lead (0.981 ppm), and zinc (9.07 ppm). Four surface water samples were collected from the Harco Property during the March 30, 1992 Extent of Contamination Survey. The sample analysis results detected high concentrations of lead, calcium, iron, and zinc in the surface water samples. On June 22, 1994 CDM collected surface water and sediment samples from the wetlands at the property. Surface water sampling analysis results detected iron, calcium, and manganese at a concentration three times the reference concentration. Sediment sample analysis detected one VOC: toluene (290J micrograms per kilogram (μg/kg)); two pesticides: 4,4'-DDE (40 μg/kg) and alpha-Chlordane (51 μg/kg), and 18 inorganic analytes. The greatest number of analytes detected at sampling location SD-02 was 13: aluminum (22,700 milligrams per kilogram (mg/kg)), arsenic (7.0 mg/kg), chromium (31.5 mg/kg), cobalt (10.8 mg/kg), copper (32.3 mg/kg), iron (25,000 mg/kg), lead (73.4 mg/kg), magnesium (4,070 mg/kg), manganese (155 mg/kg), nickel (15.3 mg/kg), potassium (1,270 mg/kg), vanadium (44.2 mg/kg), zinc (227 mg/kg).

The known source of soil contamination, determined from the Weston PA/SI and Malcolm Pirnie investigation, consists of approximately 24,000 cubic yards of soil with a minimum lead concentration of 500 ppm. This entire area of contamination is enclosed by a 4-foot fence. Access to the remainder of the property is unrestricted. No business establishments exist at the property. The nearest residence is located approximately 500 feet west of the 2.0-acre fenced area. The nearest school is located approximately 3.0 miles southeast of the property.

Air sampling was not conducted at the Harco Property. There are no records of any permits or applications for the Harco Property at the Connecticut Department of Environmental Protection. The population with 4 miles of the property is approximately 22,958. Sensitive environments located within 4 miles of the Harco Property include one threatened species, three endangered species, and three state special concern species.

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ATTACHMENT A

HARCO PROPERTY
SPECIAL ANALYTICAL SERVICES
CDM FEDERAL PROGRAMS CORPORATION
SAMPLING DATE JUNE 22, 1994

ATTACHMENT B

HARCO PROPERTY
ORGANIC ROUTINE ANALYTICAL SERVICES
CDM FEDERAL PROGRAMS CORPORATION
SAMPLING DATE JUNE 22,1994

ATTACHMENT C
HARCO PROPERTY
INORGANIC ROUTINE ANALYTICAL SERVICES
CDM FEDERAL PROGRAMS CORPORATION
SAMPLING DATE JUNE 22, 1994